

Application Notes

hp OpenView Storage Mirroring NAT Application Notes

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This document describes NAT basics and provides instructions for configuring your HP OpenView Storage Mirroring servers for a NAT environment.

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Introduction

HP OpenView Storage Mirroring, which provides real-time data protection and replication, can be used in a Network Address Translation (NAT) environment provided that the framework is established properly. This document describes NAT basics and provides instructions for configuring your HP OpenView Storage Mirroring servers for a NAT environment.

Due to the complexities of this process, this document is intended for network administrators with experience installing, configuring, and maintaining network applications and hardware, including HP OpenView Storage Mirroring and routers. If you are configuring HP OpenView Storage Mirroring for a NAT environment, you must use HP OpenView Storage Mirroring 4.2 Service Pack 2 or later. You must also have a router in place and know how to configure the ports.

NOTE: If you are using a VPN (Virtual Private Network) with your NAT installation, the VPN connection will return the physical address of each HP OpenView Storage Mirroring server allowing the current version of HP OpenView Storage Mirroring to work without any modifications. This application note only applies to strictly NAT environments.

If you do not have a NAT router installed or if you do not know how to configure the ports, see your NAT reference manual.

NAT Overview

Network Address Translation (NAT) enables a network to pool a set of internal IP addresses while presenting them as one address externally to the Internet. For example, NAT provides a company the ability to use more internal IP addresses. Since they are only used internally, there is no possibility of conflicts with IP addresses used by other companies and organizations. NAT might also provide a firewall by hiding internal IP addresses. The functionality provided by NAT depends on your configuration.

- ◆ **Static NAT**—This is the most simple configuration where a single, internal IP address is always mapped in a one-to-one correlation to a single, external IP address. If your NAT environment only has two HP OpenView Storage Mirroring servers, each on either side of a router, you need to establish static mapping on the router so that the two HP OpenView Storage Mirroring machines can communicate.
- ◆ **Dynamic NAT**—This configuration is dynamic because it allows a single, internal IP address to be mapped to any one of a group of external IP addresses managed by the router. The router maintains the external IP address selected and assigned from the group so that any incoming packets destined for that IP address are routed to the correct internal IP address. HP OpenView Storage Mirroring is not suited for this environment because of its automated features, such as auto-reconnect that attempts to automatically reestablish connections after a failure. With dynamic IP addresses, these features will not work.
- ◆ **Overloading NAT**—This configuration is known by various names including NAPT (network address port translation) and PAT (port address translation). It allows multiple, internal IP addresses to be mapped to a single, external IP address. The external IP address is distinguished by an appended port number. That makes the internal IP address to external IP address: port number mapping unique. If your NAT environment has multiple HP OpenView Storage Mirroring machines on one side of a router, you will have to establish port mappings for both the router and for HP OpenView Storage Mirroring.

NOTE: If you are using overlapping NAT, where the same IP address is being used on both sides of the router, you can use a static or overloading NAT configuration, but do not use dynamic.

HP OpenView Storage Mirroring and NAT Overview

Regardless of whether you are using a static or overloading NAT environment, you need to configure your environment so that HP OpenView Storage Mirroring traffic is permitted access through the router and directed appropriately. If you are using a static NAT environment, your setup might look similar to figure 1.

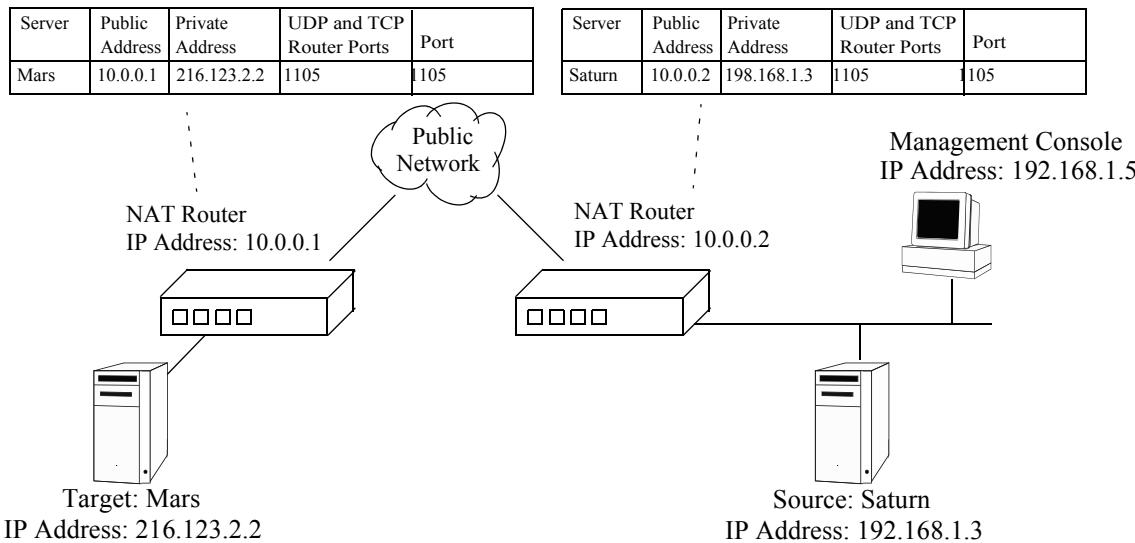


Figure 1: Sample static NAT scenario with one HP OpenView Storage Mirroring server on each side of a router.

If you are using an overloading NAT environment, your setup might look similar to figure 2.

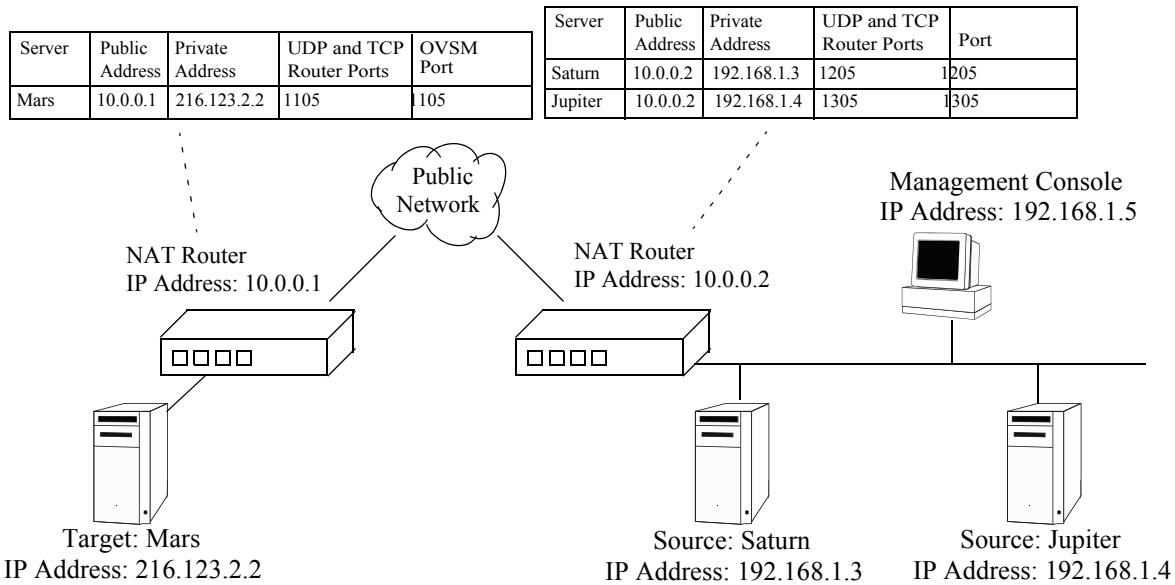


Figure 2: Sample overloading NAT environment with unique ports.

Modifying the HP OpenView Storage Mirroring Ports

HP OpenView Storage Mirroring uses multiple ports for communications. By default, during the installation, HP OpenView Storage Mirroring automatically sets these ports to an optimal configuration for a non-NAT environment. You will need to modify your port settings for NAT integration. The following table outlines all of the HP OpenView Storage Mirroring ports and gives brief guidelines on when to modify each port. Make the port modifications necessary according to your specific environment.

Port Name	Management Console Name	Communication Type	Default Port Number	When to Modify the Port
DirUNetPort NetPort	Status Listen Service Listen	Directed UDP TCP	1100	<ul style="list-style-type: none">◆ Static NAT—If you are using a static NAT environment where you only have one HP OpenView Storage Mirroring server on each side of the router, you do not need to modify your HP OpenView Storage Mirroring ports. You can keep the default port selection as it is for both HP OpenView Storage Mirroring machines. You will need to add a mapping to your router for the HP OpenView Storage Mirroring port.◆ Overloading NAT—If you are using an overloading NAT environment where you have more than one HP OpenView Storage Mirroring server on at least one side of the router, you must set unique HP OpenView Storage Mirroring ports. You may keep the default port selection for one server, but subsequent servers must have different port numbers. From the Management Console, login into a server and access the Server Properties, Network tab (right-click the server and select Properties). Modify the Service Listen and Status Listen ports so that each HP OpenView Storage Mirroring server uses unique ports. From the Text Client, use the DTCL <code>set</code> command to set the DirUNetPort and NetPort to unique ports. See the HP OpenView Storage Mirroring <i>User's Guide</i> for details. These two ports need to have the same number on a single server. The port numbers must be unique from server to server. Each port number that you use will need to be added to the router mapping.
UNetPort	Heartbeat Transmit	UDP	1105	This port is used to control the auto-population of the Management Console server tree. It does not have an impact on a NAT environment since servers across a router have to be manually inserted. Therefore, there is no need to modify this port.
StatsPort		TCP	1106	<ul style="list-style-type: none">◆ If you want to run one instance of DTStats across a router, you will need to add a mapping to your router for the StatsPort.◆ If you want to run DTStats for multiple machines, each HP OpenView Storage Mirroring server must have a unique StatsPort and each port will need to be added to the router mapping.◆ To modify the StatsPort, use the DTCL <code>set</code> command. See the HP OpenView Storage Mirroring <i>User's Guide</i> for details.◆ In order for DTStats to function properly, the StatsPort cannot be set to the same value as the DirUNetPort / NetPort.

NOTE: You must stop and restart the HP OpenView Storage Mirroring service for a changed port setting to take effect.

For use in the next section, record your HP OpenView Storage Mirroring port settings and the corresponding IP address of that server.

HP OpenView Storage Mirroring Port Configuration

Configuring the Router

Regardless of whether you are using a static or overloading NAT environment, you need to configure your router so that HP OpenView Storage Mirroring traffic is permitted access through the router and directed appropriately. Using the information you recorded in the *HP OpenView Storage Mirroring Port Configuration* table, set up the configuration table on the router to identify each server and its corresponding IP address, HP OpenView Storage Mirroring port and NAT port.

NOTE: Make sure that both the UDP and TCP ports on the router match the port used by the HP OpenView Storage Mirroring server.

Since HP OpenView Storage Mirroring communication occurs bidirectionally between the source and target servers, make sure you configure your router(s) for all of your HP OpenView Storage Mirroring machines.

Since there are many NAT routers on the market, each router can be configured differently. See your NAT reference manual for instructions on setting up your particular router.

Server	Public Address	Private Address	UDP and TCP Router Ports	Port
Saturn	10.0.0.2	192.168.1.3	1205	1205
Jupiter	10.0.0.2	192.168.1.4	1305	1305

Figure 3: Sample router table.

Using the Management Console in a NAT Environment

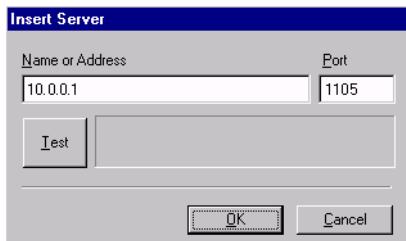
By default, servers across a router will not automatically be populated in the Management Console. You must insert them manually. After the server is inserted, connections are established like other HP OpenView Storage Mirroring connections but you need to specify the correct route. The next two sections cover these topics in detail.

Inserting the servers in the Management Console

When you start the Management Console, it will not be able to see servers automatically across a router. Therefore, those machines will need to be manually inserted.

NOTE: If a machine is manually inserted into the Management Console, it will automatically be saved in your workspace and will appear the next time the Management Console is started. If you established unique HP OpenView Storage Mirroring ports, subsequent restarts of the Management Console will display the server saved in the workspace, but it will appear with a red X as if there is a problem. The X appears because communication cannot automatically be established. If you login to the server (by double-clicking on it), communications will be established and the X will be removed.

1. Open the Management Console (**Start, Programs, HP OpenView Storage Mirroring, Management Console**).
2. Select **Insert, Server**.



3. Type the IP address of the router and the port number used by the HP OpenView Storage Mirroring server.

NOTE: If your traffic is routed across more than one router, enter the IP address of the router that the HP OpenView Storage Mirroring server is connected to. For example, if you are using the Management Console as displayed in Figure 2 and need to insert the target Mars, you would insert the IP address 10.0.0.1 and the port number 1105.

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4. Click **Test**. After the machine is located, the machine name will be inserted into the Management Console server tree.

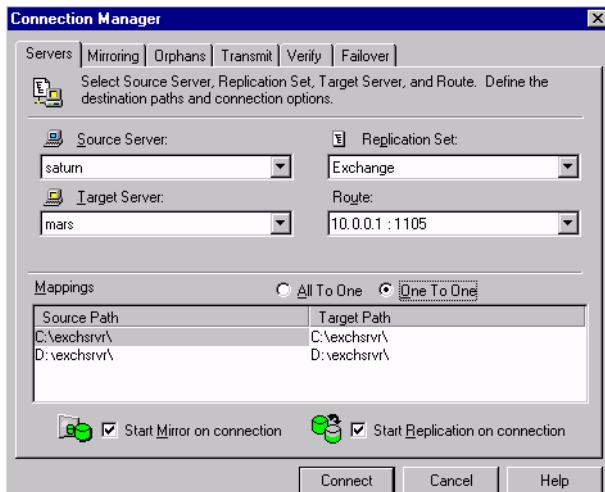
WARNING: If the machine was located, but Double-Take is not running on it, you will be given the choice of inserting the machine anyway. Click **Yes** to insert the server into the Management Console server tree. Verify that HP OpenView Storage Mirroring is running on that machine before continuing.

If the server could not be located, you will see a message to the right of the **Test** button stating that it was not found. Verify that you are entering the correct IP address and that you have configured your router correctly.

Establishing the connection

Connections across a router are established like any other HP OpenView Storage Mirroring connection, but you must make sure that you specify the correct route across the network so that the HP OpenView Storage Mirroring traffic will be transmitted successfully.

1. Open the Connection Manager. (For a complete list of all the methods available for accessing the Connection Manager, see the HP OpenView Storage Mirroring *User's Guide*.)
2. Some entries on the **Servers** tab will be completed depending on which method you used to access it. Verify that the correct **Source Server** and **Replication Set** are identified
3. Select your **Target Server** and the IP address of that machine will automatically be inserted in the **Route** field.
4. Since the router is going to prevent sending data directly to the IP address of the target machine, change the **Route** to the IP address and port of the router.



NOTE: If your traffic is routed across multiple routers, enter the IP address of the router that the HP OpenView Storage Mirroring server is connected to. For example, if you are using the Management Console as displayed in Figure 2 and need to connect to the target Mars, you would select 10.0.0.1:1105.

If your target machine is located on the same subnet as your Management Console, the route field will not automatically contain the target machine's router information. For example, if the Management Console in Figure 2 was on the target subnet instead of the source subnet, you would have to manually type in 10.0.0.1:1105 in the **Route** field rather than selecting it from the list.

5. Select the target path, which corresponds to the desired location on the target where the replicated data will reside, by selecting **One-to-One** or **All-to-One**. If you want to specify a custom location, select either of the radio buttons and then click on the directory entry under the **Target Path** column. You will be in edit mode and can specify the desired location on the target for the replicated data.
6. If you want mirroring and/or replication to start immediately when the connection is established, mark either or both of the two check boxes at the bottom of the **Servers** tab.

NOTE: Other tabs are available in the Connection Manager to set advanced connection settings. To establish a connection, you do not need to make modifications to these tabs; a connection can be established with the default settings. For more information on these advanced settings, see the HP OpenView Storage Mirroring *User's Guide*.

7. Click **Connect** to establish the connection.

Your connection is now established. Data will be transmitted to the target across the router. HP OpenView Storage Mirroring functionality and monitoring will continue and be available as with any other version of HP OpenView Storage Mirroring.

Using the Text Client in a NAT Environment

Since servers are not automatically populated in the Text Client, you do not have to worry about inserting them as you did in the Management Console. But you still need to login to the machine and specify the correct route to establish a connection.

1. Login to the source by using the **login** command. This command is the same except that you need to specify the IP address and port of the machine, rather than the machine name.

Command	LOGIN
Description	Log on to a Double-Take machine
Syntax	LOGIN <machine> <username> <password> [domain]
Options	<ul style="list-style-type: none">◆ machine—Name of the IP address and port of the machine◆ username—Name of the user◆ password—Password associated with username.◆ domain—If logging in using a domain account, this is the domain name. If logging in using a local account, this is the machine name.
Examples	<code>login 10.0.0.1:1105 administrator *****</code>
Notes	<ul style="list-style-type: none">◆ The login command is not available when scrolling through the Text Client command history.◆ If characters in the password include non-alphanumeric characters, the password field must be enclosed in quotation marks.◆ The password cannot be a Double-Take keyword. These are any DTCL command (source, target, and so on.) or any DTCL shortcut command (env, mon, rep, and so on).◆ If your traffic is routed across multiple routers, enter the IP address of the router that the HP OpenView Storage Mirroring server is connected to. For example, if you are using the Management Console as displayed in Figure 2 and need to connect to the target Mars, you would select 10.0.0.1:1105.

2. Identify the machine that you just logged into as the source by using the **source** command. This command is also the same except that you need to specify the IP address and port of the machine, rather than the machine name.

Command	SOURCE
Description	Identifies a machine as the active source machine
Syntax	SOURCE <source_machine>
Options	source_machine —Name of the machine
Examples	<code>source 10.0.0.1:1105</code>
Notes	If your traffic is routed across multiple routers, enter the IP address of the router that the HP OpenView Storage Mirroring server is connected to. For example, if you are using the Management Console as displayed in Figure 2 and need to connect to the target Mars, you would select 10.0.0.1:1105.

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3. Connect the replication set to the target by using the **connect** command. Again, this command is the same except that you need to specify the IP address and port of the target machine.

Command	CONNECT
Description	Establishes a connection between a replication set and a target machine
Syntax	<code>CONNECT <repset> TO <target_machine> MAP EXACT BASE <target_path> <source_path> TO <target_path> [,,...] [MIRROR NOMIRROR] [, REPLICATE NOREPLICATE] [, MONITOR NOMONITOR] [, ORPHANS NOORPHANS]</code>
Options	<ul style="list-style-type: none">◆ repset—Name of the replication set◆ target_machine—Name of the target machine, an IP address on the target machine, or a virtual IP address◆ MAP EXACT—Specifies that the replication set data will be sent to the same logical volume on the target (c:\data and d:\files is copied to c:\data and d:\files, respectively)◆ MAP BASE—The replication set data will be sent to the locations specified below:<ul style="list-style-type: none">◆ connect repset to target—If mappings are not specified with the command, map base will be used by default. The data will be replicated to \SrcName\RepsetName\SrcVolName on the target machine◆ connect repset to target map base target_path—Substitute a complete path, including the volume, for target_path and the data will be replicated to target_path\SrcVolName on the target machine◆ connect repset to target map base source_path TO target_path—Custom location that specifies each directory on the source and where that data will be copied to on the target machine◆ ...—Indicates that the source_path TO target_path option can be used more than once for each source directory in the replication set◆ MIRROR—Automatically initiates a mirror when the connection is established◆ NOMIRROR—Does not initiate a mirror when the connection is established◆ REPLICATE—Automatically initiates replication when the connection is established◆ NOREPLICATE—Does not initiate replication when the connection is established◆ MONITOR—Specifies that the target is going to monitor the specified source machine for failover. The source machine must have already been defined as a monitor machine.◆ NOMONITOR—Specifies that the target is not going to monitor the source machine for failover◆ ORPHANS—Removes orphan files on the target◆ NOORPHANS—Does not remove orphan files on the target
Examples	<code>connect Exchange to 10.0.0.1:1105</code>
Notes	<ul style="list-style-type: none">◆ The default settings for this command are map base, mirror, replicate, nomonitor, and noorphans.◆ If a path begins with a non-alphabetic character or if the replication set name includes non-alphanumeric characters, the path or name must be enclosed in quotation marks.◆ If your traffic is routed across multiple routers, enter the IP address of the router that the HP OpenView Storage Mirroring server is connected to. For example, if you are using the Management Console as displayed in Figure 2 and need to connect to the target Mars, you would select 10.0.0.1:1105.

Your connection is now established. Data will be transmitted to the target across the router. HP OpenView Storage Mirroring functionality and monitoring will continue and be available as with any other version of HP OpenView Storage Mirroring.